

Notice of Allowability

Application No.

08/907,182

Examiner

Alan Diamond

Applicant(s)

YAMAZAKI ET AL.

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to the response and terminal disclaimer filed 02/02/2006.
2. ☒ The allowed claim(s) is/are 26-29,32-37,39-45,47-54,57-62,64-70,73-76,78,79,81-91,93-99 and 103-107.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☐ All b) ☐ Some* c) ☐ None of the:
 1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 08/623,336.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
 5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08),
Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit
of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413),
Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

REASONS FOR ALLOWANCE

1. The following is an examiner's statement of reasons for allowance: Gotou et al (U.S. Patent 6,436,745) is already of record in the instant application and is pertinent because it performs its gettering of a crystallized silicon film using "a second silicon film containing a group V element" (see claim 1 at col. 8). Gotou et al cannot be used as a reference against the instant claims due to its later filing date. Furthermore, there is no interference with the claims of Gotou et al because, although the group V element can be phosphorus, a silicon film containing phosphorus does not encompass a phosphorus silicate glass as in instant independent claims 26, 34, 42, 51, 59, 67, 76, 82, and 86. Silicate is not silicon. Note, for example, at col. 6, lines 53-57, of Gotou et al that an amorphous silicon (a-Si) film containing phosphorus is used as the gettering layer. A skilled artisan requesting a silicon film will not expect to receive a silicate glass film. Furthermore, with respect to instant independent claims 81, 83-85, and 87-89, the claims of Gotou et al do not lead a skilled artisan to introducing a gettering material (such as phosphorus) into a surface of the crystallized semiconductor film within a region of 0.1 to 0.2 μm in depth from the surface of the crystallized semiconductor film.

The fact that the instant claims are not limited to silicon as the semiconductor material, but rather recite, for example, "a semiconductor film" in the providing step (see claim 26, line 3), is supported by page 5, line 15, of the originally filed specification (filed 08/06/1997), where a "semiconductor layer" is referred to. Furthermore, the Examiner acknowledges that each of the instant independent claims is drawn to "A method of manufacturing a semiconductor device ...". The originally filed disclosure refers to "a

photoelectric conversion device" and "a solar cell" (see, for example, page 1, lines 5-11, and page 5, lines 4-21, of said originally filed specification). In the instantly claimed method, a semiconductor film is crystallized, and then gettering is performed on the crystallized semiconductor layer. A skilled artisan would readily recognize that such a process could be performed for a semiconductor layer in practically any semiconductor device, not just a photoelectric conversion device or solar cell. In other words, the Examiner has permitted the broader claim language "semiconductor device" (just as in claims 25-31 of U.S. Patent 5,700,333 which issued from parent application 08/623,336) because the description of the instant method that prepares a semiconductor film in a photoelectric conversion device or solar cell would immediately convey to any person skilled in the art the knowledge that the applicant invented a method that prepares a semiconductor film regardless of the type of semiconductor device. Crystalline semiconductor films are prepared for and used in a myriad of semiconductor devices.

The term "insulating surface" in each of the independent claims is supported by the originally filed disclosure. Firstly, the method of originally filed claim 1 does not even require a substrate or surface upon which the semiconductor layer is formed. Secondly, page 9, line 14-15, of the originally filed specification refers to the substrate as "an underlying layer". This underlying layer is exemplified as glass, and a skilled artisan is well aware of a myriad of other insulating materials that can be used in place of glass.

It is acknowledged that independent claims 26, 34, 42, 51, 59, 67, 76, 82, and 86 recite that the phosphorus silicate glass gettering layer is formed on an entire surface of

the semiconductor film. This supported by, for example, instant Figure 1B, which schematically shows phosphorus silicate glass layer (105) formed over an entire surface of the semiconductor film (104) (see also page 11, lines 3-5, of the originally filed specification). A skilled artisan would readily recognize that the instant gettering layer could be formed over the entire surface of the semiconductor layer.

The terminal disclaimer over U.S. Patent 5,961,743, filed 02/02/2006 has been entered and approved. The instant application is already terminally disclaimed over U.S. Patents 6,242,290, 6,399,454, and 5,700,333.

There is no obviousness-type double patenting over the claim of, for example, U.S. Patents 6,624,049 and 6,133,119 (which are hereby made of record) because the claims in these patents lack the instant phosphorus silicate glass, introduction of gettering material to a depth of 0.1 to 0.1 μm , or removing the surface of the crystallized semiconductor film after gettering the metal in the semiconductor film.

There is no obviousness-type double patenting rejections over the claims of U.S. Patent No. 6,821,710 (which is already of record) because instant claims 26, 34, 42, 51, 59, 67, 76, 82, and 86 require that the gettering layer comprising phosphorus silicate glass is formed over an entire surface of the semiconductor film. The Examiner agrees with applicant's argument (page 19 of the Response filed 08/25/2005) that "[t]he claims of the '710 patent recite forming a phosphorus silicate glass in the region using the same mask as the making step. Thus, since the mask is employed, the phosphorous silicate glass would not cover the entire surface of the semiconductor film." Indeed, the

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mask in the claims of said patent is applied to only a portion of the amorphous semiconductor film, not the entire film.

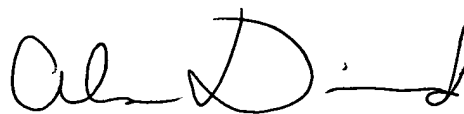
U.S. Patent 6,962,837 is hereby made of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

2. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Alan Diamond whose telephone number is 571-272-1338. The examiner can normally be reached on Monday through Friday, 5:30 a.m. to 2:00 p.m. ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nam Nguyen can be reached on 571-272-1342. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Alan Diamond', with a stylized flourish at the end.

Alan Diamond
Primary Examiner
Art Unit 1753

Alan Diamond
February 6, 2006

O.C. FIG. 2A-2D	
CLASS	SUBCLASS
498	58
136 258	
APPROVED	BY

Fig. 1A

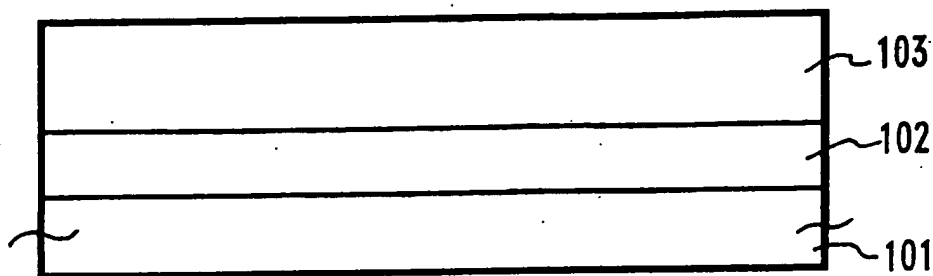


Fig. 1B

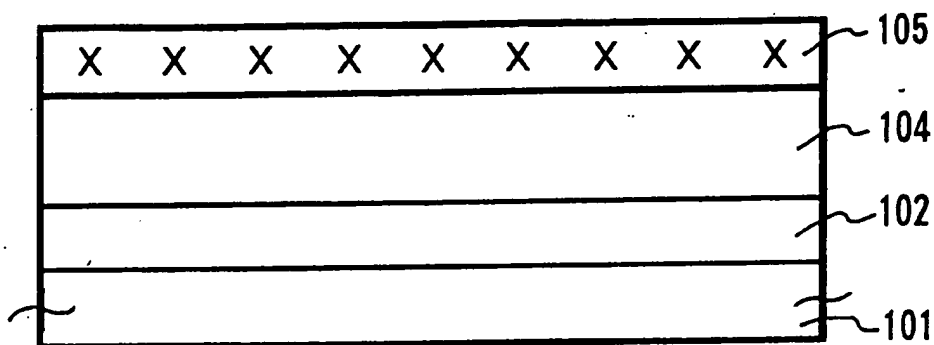


Fig. 1C

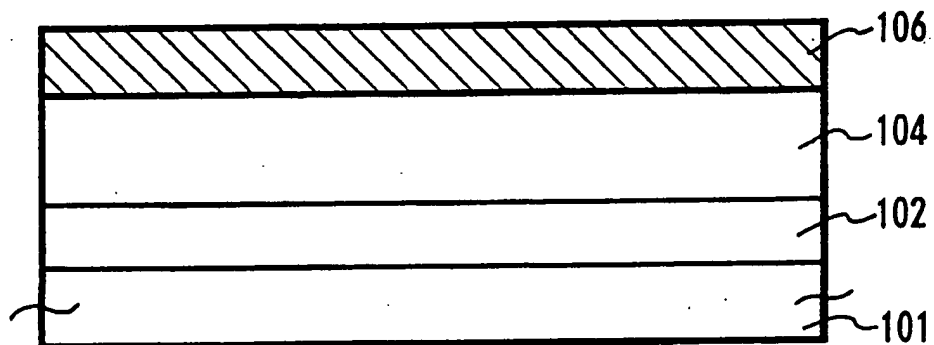


Fig. 1D

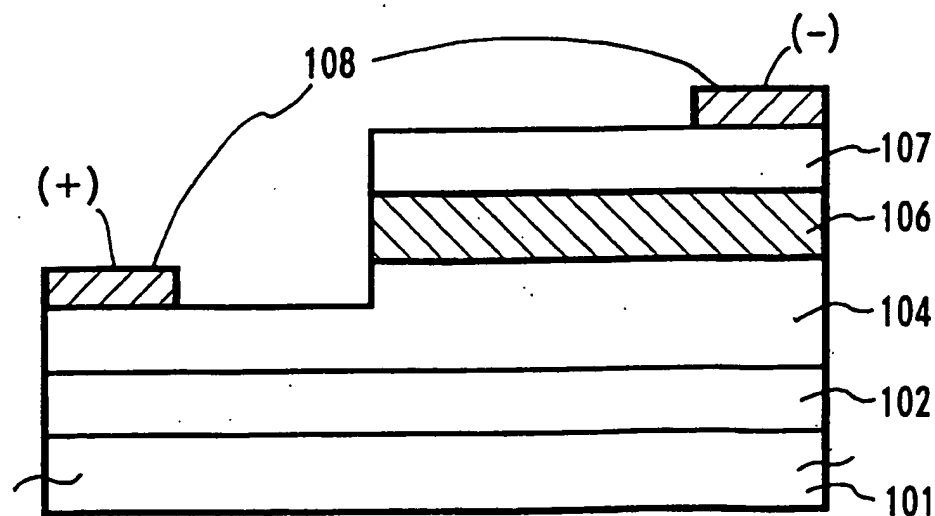


FIG. 2A	O.C. FIG. 2A-2D	
	CLASS	SUBCLASS
136	488	58
258		

Fig. 2A

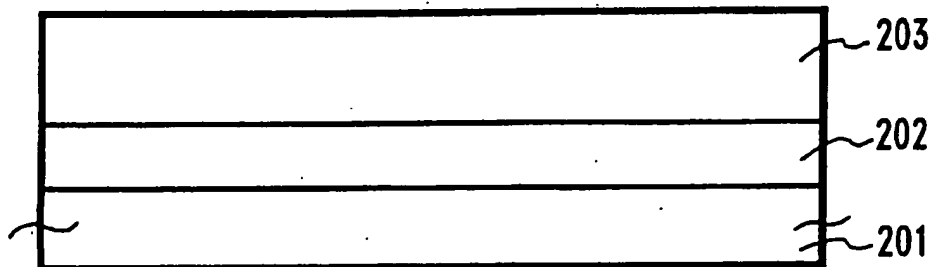


Fig. 2B

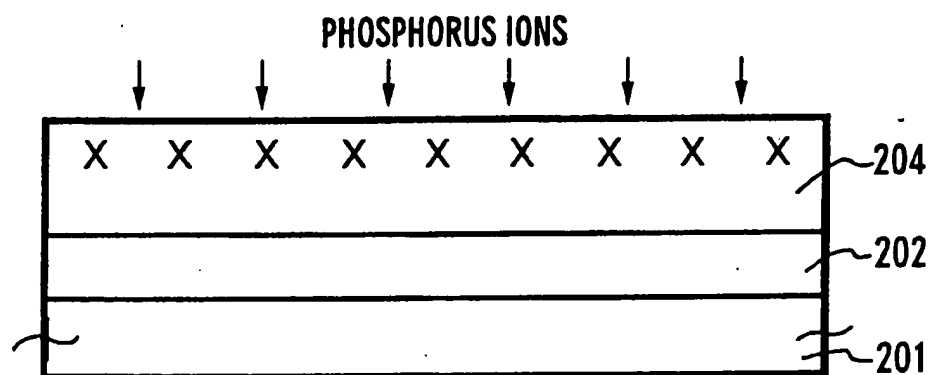


Fig. 2C

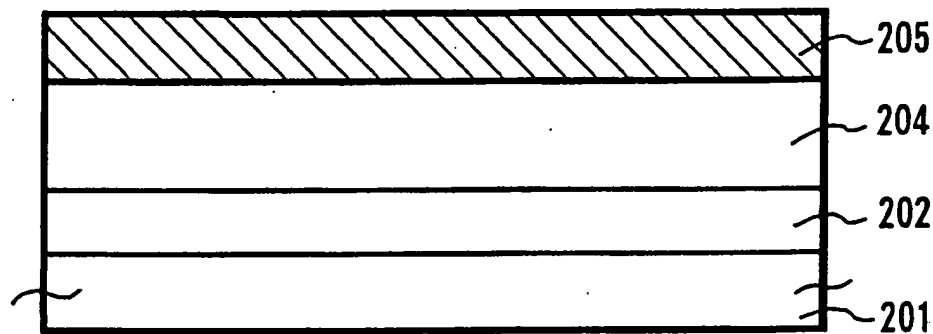


Fig. 2D

